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09/528,889	03/20/2000	Gregory N. Hullender	1204	5627

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EXAMINER

DASTOURI, MEHRDAD

ART UNIT	PAPER NUMBER
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2623

DATE MAILED: 02/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/528,889

Applicant(s)

HULLENDER ET AL.

Examiner

Mehrdad Dastouri

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 15 December 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Response to Arguments***

1. Applicants' response filed December 15, 2003, has been entered and made of record.
2. Applicants' arguments have been fully considered but they are not persuasive. Applicants argue in essence that the primary recognizer of the instant application "simply outputs a shape index, while specifically not making any such ambiguity-related decisions or actions", but fails to acknowledge how the primary recognizer of the instant invention is trained. Applicants did not provide adequate support that how the primary recognizer of the instant application perform differently during training stage and recognition stage, which is in fact an invalid methodology.

Consequently, the response to Applicants' arguments stated in Paragraphs 2—7 of Office Action Paper No. 18 are yet in effect and are therefore applicable.

### ***Claim Rejections - 35 USC§ 112***

3. The following is a quotation of the first paragraph of 35 U. S. C. 112:  

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.
4. Claims 1-27 are rejected under 35 U. S. C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 1, 7, 13 and 18 with respect to the primary recognizer recite the limitation, "without making any decision

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as to whether that chirograph is of a set of easily confused chirographs". However, as pointed out above, the primary recognizer is trained to distinguish between confusion pairs. The specification states, "In accordance with one aspect of the present invention, as described in more detail below, those chirographs which often confuse a recognizer are provided to a secondary recognition process" [emphasis added]. Specification, Page 6, Lines 11-14. Applicant's specification goes on to state, "Note that such often confused chirographs are not limited to sets of two, but are often confused with two or more other chirographs." Specification, Page 7, Lines 4-6.

Additionally it states, "In an alternative, embodiment, the primary recognizer can be trained to recognize shape classes that represent code points (or subsets of code points that look alike" [emphasis added]. Specification, Page 7, Lines 7-9. For additional support see, page 9, Lines 20-23, and page 21, Lines 13-16.

Furthermore, in Figure 11 and its associated description on pages 22 and 23 of the specification, Applicant in element 1104 of Figure 11 shows a DECISION block as to whether the code point has an associated Cart Tree (secondary recognizer and the specification states, "the code point 82 is used (by a lookup process 84 or the like) to determine if the code point has a CART tree associated therewith." Specification Page 22, Line 25-Page 23, Line 2.

Additionally, Figure 11 of the instant application clearly shows a DECISION block. Since the primary recognizer is trained on characters that tend to confuse recognizers, the primary recognizer does in fact make decisions based upon whether the chirograph is of a set of easily confused characters.

Claims 2-6, 8-12, 14-17 and 19-27 are rejected for their dependency upon rejected Claims 1,7,13 and 18.

***Claim Rejections - 35 USC § 103***

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

6. Claims 1, 2, 7, 8, 12, 20, 21 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pintsov, U.S. 5,881,172.

As per Claim 1, Pintsov teaches:

providing a primary recognizer (universal classifier system, abstract, Column 2, Lines 7-34, Column 20, Lines 28-54) for converting chirographs (Column 2, Line 21, "styles of handwriting" and Column 2, Lines 34-35) to shape indexes; applicant states in his arguments that the out put of the primary recognizer could be "in the form of a shape index, such as a code point" (pg. 11 of amendment entered into the file September 20, 2001), Pintsov's universal classifier outputs "machine-readable data, typically in ASCII form', Column 1, Lines 47-49. Pintsov goes on to state that the "character may be recognized by the universal classifier", the recognition result inherently being in the form of a shape index classification or code point.

providing a plurality of secondary recognizers ("specialist classifiers", Column 3, Lines 16-18) to convert chirographs into code points (Column 4, Lines 10-14), and associating the secondary recognizers with at least some of the shape indexes ("ambiguity classes", Column 3, Lines 18-21),

receiving a chirograph (Column 1, Lines 10-11, "automated recognition of handwritten characters").

providing a chirograph to a primary recognizer and receiving a shape index therefrom (Column 3, Lines 55-60, "character candidate", Pintsov goes on to state that the "character may be recognized by the universal classifier", the recognition result inherently being in the form of a shape index classification or code point.), the primary recognizer providing the shape index without making any decision as to whether that chirograph is of a set of easily confused chirographs (Column 4, ll. 4-10, Pintsov teaches that the universal classifier system (Figure 5, block 100) can always be pre-programmed to recognize that a character is suspicious (Figure 5, block 102) based on the listed suspicion criteria and then select a specialist classifier (Figure 5, block 106).

Pintsov does not teach, other than using the recognition result of the universal classifier (primary recognizer) to select the specialist classifier (secondary recognizer), that the specialist classifier without further decision by the primary recognizer. Pintsov discloses that the universal classifier "calls" the specialist classifier. By using quotes it is ambiguous as to whether Pintsov system does a specific call to the classifier or based upon the output of the universal classifier another portion of the system makes the call. But such a determination is well within the ordinary skill of one in the art to call the specialist classifier based on commands executed in the universal classifier or a part of the system that receives the output from the universal classifier and calls the specialist classifier. Additionally since Pintsov teaches that the selection is based upon the

probable identity of the candidate character, the universal classifier has already made a decision on the character.

determining whether one of the secondary recognizers is associated with the shape index ("Any particular specialist classifier is selected based upon the probable identity of a candidate character... and whether the candidate character is 'suspicious'."), and if so, selecting that secondary recognizer as a selected secondary recognizer. Furthermore, in discussing Figure 5, Pintsov states that one or more universal classifiers are applied to the image data to generate a probable character, and then a determination is made to call the universal classifier (Column 3, Line 65, Column 4, Lines 22). Having possibly conflicting reports from each universal classifier as to call or not call seems to not be what Pintsov is teaching, Pintsov appears to be teaching that a determination is made to call a specialist classifier only after the character is recognized and determined to be part of the suspicious class of characters.

It would have been obvious to one of ordinary skill in the art to use either the universal recognizer to call the specialist classifier or merely output a recognition result and another part of the system call the specialist classifier. Such decisions are made to take advantage of processing efficiencies of the host computer systems and also to bring to bear the full power of various feature extraction algorithms to accurately identify characters that may be part of a specific ambiguity class of characters (Pintsov, Column 3, Lines 30-35).

As per Claims 7, 20 and 23, it recites substantially the same limitations as Claim 1 above except only broader and analogous remarks apply.

As per Claim 21, Pintsov teaches:

wherein the shape index does not correspond to a code point (Column 3, Lines 48, "probable identity", and Column 4, Lines 13-20, where the final output is a code).

As per Claims 2, and 8, they recite identical limitations and, therefore, the following remarks apply to each.

Pintsov teaches:

shape index comprises a code point (the output of the universal classifier is a "machine readable data, typically in ASCII form", Column 1, Lines 47-49, or Column 3, Lines 55-60, "character candidate", Pintsov goes on to state that the "character may be recognized by the universal classifier". By recognizing the character, which he teaches is usually output in ASCII form, it inherently follows that the value passed to the specialist recognizer would also be in ASCII form.)

As per Claim 12, Pintsov teaches: wherein the recognition result comprises a code point. (Column 1, Lines 47-48). Claims 19 and 22 rejected under 35 U.S. C. 103(a) as being unpatentable over Pintsov as applied to Claims 1 and 7, further in view of Shimizu et al. (hereinafter Shimizu, US 6038343).

As per Claims 19 and 22, Pintsov teaches that his specialist classifiers are called when a character is determined to be suspicious (Column 4, Line 10-22). However, Shimizu teaches:

wherein each shape index that the primary recognizer (fig. 1, element 11) is capable of outputting has a unique secondary recognizer (fig. 1, element 17) associated therewith.

It would have been obvious to one of ordinary skill in the art to use the writer specific feature vectors of Shimizu to augment the system of Pintsov to increase the ratio of a character recognition system employing a universal recognition dictionary without requiring that special operations be performed before character recognition is performed on the handwriting of a new writer (Simizu, Column 2, ll. 17-22, Column 3, Lines 1-6).

7. Claims 13-15, 17, 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pintsov as applied to Claims 1 and 7, further in view of Crane, US 4,531,231.

As per Claim 13, it recites substantially the same limitations as Claim 1 above except only broader and analogous remarks apply. Claim 13 does have two different limitation that requires further explanation. Pintsov teaches that his recognition system can be used for automated recognition of handwritten characters (Column 1, Lines 10-11), but he does not specifically state an interface means for accepting a handwritten character data. Pintsov teaches accepting image data from some device (see Figure 4, element 3). The claim recites that the use of an "interface configured to receive a chirograph", Crane teaches an interface (see figs. 1 elements 12 and 14). It would have been obvious to one of ordinary skill in the art to utilize the handwriting input means of Crane in the system of Pintsov to provide a registration means so that Pintsov could accept handwritten characters so that Pintsov could utilize his method of automated handwriting recognition. Additionally, the Crane reference is used to illustrate that such an interface feature is well-known in the art of computer-based handwriting recognition.

The second limitation is partially addressed by the comments with respect to a similar limitation in Claim 1 however, the selection mechanism is not completely disclosed, however, Pintsov teaches:

a selection mechanism that selects a selected secondary recognizer based on the shape index, without further decision by the primary recognizer (Column 3, Line 65-Column 4, Line 22).

As per Claim 14, Pintsov teaches:

shape index comprises a single code point (the output of the universal classifier is a "machine-readable data, typically in ASCII form", Column 1, Lines 47-49 or Column 3, Lines 55-60, "character candidate", Pintsov goes on to state that the "character may be recognized by the universal classifier". By recognizing the character, which he teaches is usually output in ASCII form, it inherently follows that the value passed to the specialist recognizer would also be in ASCII form.).

As per Claim 15, Pintsov teaches: wherein the shape index comprises a single code point that differs from the returned code point (Column 4, lines 15-23, Pintsov states, "Note that the character determined by the selected specialist classifier may be the same character determined as being most probable by the universal classifier system" (emphasis added). This statement indicates that the code point returned may differ from the code point provided to the specialist classifier.

As per Claims 17, they recite generally the same limitation as Claim 15 except more broadly and analogous remarks apply.

As per Claim 24, Pintsov teaches:

wherein the shape index does not correspond to a code point (Column 3, Lines 48, "probable identity", and Column 4, Lines 13-20, where the final output is a code).

As per Claim 25, Pintsov teaches:

wherein the recognition information does not correspond to a code point, (Column 3, Lines 48, "probable identity") and wherein the recognition result comprises a single code point (Column 4, Lines 13-20, where the final output is "a" code (singular)).

8. Claims 16, 18, 26 and 27 are rejected under 35 U.S. C. 103 (a) as being unpatentable over Pintsov and Crane as applied to Claim 13 above, and further in view of Guo et al. (Guo), "Classification trees with neural network feature extraction", Proceedings IEEE Computer Society Conference on Computer Vision and Pattern Recognition, June 1992.

As per Claim 18, Pintsov does not teach a specific means to accept a chirograph, however, Crane teaches: receiving a chirograph (Figure 1, elements 12 and 14). Although Crane teaches providing the shape information to a character set discriminator (Figure 1, element 16), the examiner is relying upon the teachings of Pintsov to teach the recognition method. Pintsov teaches: providing the chirograph (image data, Figure 4, element 3) to a primary recognizer (universal recognizer, Figure 4, element 8) and receiving recognition information therefrom a primary recognizer for converting chirographs to code points (Column 1, Lines 47-49). determining whether the recognition information corresponds to a recognized result (Column. 4, Lines 11-23) or has a value indicative [of a specialist classifier]. Pintsov teaches that the specialist classifier can be selected based upon any desired criteria including "assignment of a

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character candidate to by the universal classifier system to a predefined characters groups known to be ambiguous", Column 3, Lines 50-60). The examiner is interpreting this portion of the disclosure to mean that the universal recognizer assigns a character value to the input data, such as an ASCII value for the number "4", his system, then looks at the predefined characters that are part of an ambiguity set, which includes "4" due to its resemblance to "9". Therefore, Pintsov teaches that the specialist recognizer is selected based upon the value returned from the universal classifier. and without the primary recognizer making a further decision (Column 3, Line 65-Column 4, Line 10). Pintsov does not specifically teach the use of CART trees as specialist classifiers. Pintsov does, however, teach that the "specialist classifiers may be implemented in any desired fashion using... algorithms known in the art of character recognition" (Column 3, ll. 26-31). Guo teaches a recognition algorithm that is known in the art.

Guo teaches Cart trees are used to solve difficult pattern recognition problems with complex decision or human judgment boundaries (Column 2, second paragraph, Page 183). Guo also teaches that a decision rule is associated with a tree Column 1, second paragraph, Page 184

Pintsov teaches the structure of the following Claims and Guo teaches the use of a CART tree:

determining whether the recognition information corresponds to a recognized result or has a value indicative of a CART tree being associated therewith (Pintsov, Column 3, Lines 50-60, Guo, section 4.2);

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if the recognition information corresponds to a recognized result, and if the recognition information has the value indicative of the CART tree being associated therewith, providing chirograph information to the CART tree and returning a recognition result wherefrom, the recognition being independent of the value indicative of the CART tree. (Pintsov, Column 4, Lines 422, Guo, section 4.2).

It would have been obvious to one of ordinary skill in the art at the time of the invention to integrate methodology of the CART algorithm with respect to handwriting as taught by Guo as a result of the optimization of the splitting criterion and the use of the Gini criterion as a specialist classifier in the system of Pintsov to bring the full power of the CART algorithm as taught by GUO to bear on the specific ambiguity class to provide a more accurate result.

As per Claim 16, it simply recites the use of a CART tree as a secondary recognizer and the remarks in rejecting Claim 18 above apply to those Claims. 9.

As per Claim 26, Pintsov teaches: wherein the shape index does not correspond to a code point (Column 3, Lines 48, "probable identity", and Column 4, Lines 13-20, where the final output is a code). As per Claim 27, Pintsov teaches: wherein the recognition result comprises a single code point (Column 4, Lines 13-20, where the final output is "a" code (singular)). 13. Claims 3-6 and 9 -11 are rejected under 35 U. S. C. 103 (a) as being unpatentable over Pintsov and Crane as applied to Claim 13 above, and further in view of Guo et al. (Guo), "Classification trees with neural network feature extraction", Proceedings IEEE Computer Society Conference on Computer Vision and Pattern Recognition, June 1992. As per Claims 3 and 9, Pintsov teaches the "specialist

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classifiers may be implemented in any desired fashion using... algorithms known in the art of character recognition" (Column 3, Lines 2631). Guo teaches a recognition algorithm that is known in the art. Guo teaches: wherein the secondary recognizer is a CART tree. (section 4.2) It would have been obvious to one of ordinary skill in the art at the time of the invention to integrate methodology of the CART algorithm with respect to handwriting as taught by Guo as a result of the optimization of the splitting criterion and the use of the Gini criterion as a specialist classifier in the system of Pintsov to bring the full power of the CART algorithm as taught by GUO to bring to bear the full power of various feature extraction algorithms known in the art of character recognition to accurately identify characters that may be part of a specific ambiguity class of characters (Pintsov, Column 3, Lines 30-35) by using a method that improves on standard classification tree design methods by reducing the number of nodes and having a lower error rate (Guo, abstract) As per Claim 4 and 10, Guo teaches: training the secondary recognizers by providing a first training set comprising a plurality of chirographs and actual code points for each chirograph (Page 185, sect. 3.1, second paragraph). Guo states that the pattern vectors (actual code points) and their class labels (chirograph) are at a given node. Further in section 4.2 he states that the handwritten character is encoded into pattern vectors. As per Claims 5 and 11, Guo teaches: wherein training the secondary recognizers further comprises determining a plurality of distinguishing features of the chirographs based on predetermined criteria. Guo teaches that CART trees are grown by recursively finding splitting rules until it cannot be split further (Page 184, sect. 2.1 TREE GROWING. He further teaches in his

introduction section, Page 183, that trees classify an input pattern through a chain of decisions. Typically decisions when flow charted are presented in the form of a question (e.g., Does value x exceed threshold b?). As per Claim 6, Guo teaches: wherein the predetermined criteria correspond to questions, and wherein training the secondary recognizers further comprises determining a question ordering by measuring the quality of each question. (Page 185, sect. 3.1 TREE GROWING, last paragraph of Column 1 and first part of Column 2.) Guo teaches that two different criteria are optimized to find a "good split", it is obvious in the use of CART trees that a quality question would result in a "good split".

### ***Conclusion***

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

**Contact Information**

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mehrdad Dastouri whose telephone number is (703) 305-2438. The examiner can normally be reached on Monday to Friday from 8:00 a.m. to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on (703) 308-6604. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mehrdad Dastouri  
Primary Examiner  
Art Unit 2623  
February 19, 2004

**MEHRDAD DASTOURI**  
**PRIMARY EXAMINER**

*Mehrdad Dastouri*